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The Fifth Year Book of the National Herbart Society, 1899; Schouler, *History of the United States;* McMaster, *History of the United States;* Stedman and Hutchinson, *Library of American Literature.*

GEOGRAPHY.

ZONIA BABER.

A STUDY of Chicago and its environs will form the starting-point for the work in geography. It will be treated as a type region, and this outline may be applied in general to any district.

Excursions will be made to the Chicago harbor, crib, and lighthouse. Certain commercial activities will be noted about the harbor, and the source of the city's water supply will be studied at the crib. A trip through the Chicago river and the drainage canal to Lockport will afford an opportunity for studying the industrial and commercial activity of the region, a mode of disposition of the sewerage of a large city, and the condition and formation of the Desplaines river valley through which the canal passes. An excursion to Dune Park will afford an opportunity of studying wind as a surface-shaping agent, and the resultant consequences in relation to shore phenomena. A third excursion to the north shore will illustrate stream action and certain glacial phenomena, while a trip to Stony Island will emphasize other aspects of glacier work, and of rock formation.

Trips to the Field Columbian Museum will be made for the study of illustrative material.

In tracing to the sources the material conditions which have contributed largely to the development of this city, we shall make a special study of North America and Eurasia. Drawing, modeling, photographs, stereopticon pictures, maps, and museum material will be employed constantly in the work.

I. INFLUENCE OF THE STUDY OF GEOGRAPHY.

1. *Culture aspect.*—(*a*) Breadth of outlook. (*b*) Intellectual training. (*c*) Æsthetic training. (*d*) Moral influence.

2. *Utility consideration.*—(*a*) In commerce. (*b*) In war. (*c*) In migration. (*d*) Establishment of new enterprises.

II. COURSE OF STUDY FOR ELEMENTARY AND SECONDARY SCHOOLS.

A. BASIS: Previous experience of student. Present environment. (1) Human aspect. Appearance and habits of peoples. Industries, commerce, political geography. (2) Landscape — present and past. Physiographic agents. (3) Geographic distribution of plants and animals, metals, and minerals.

B. MATERIALS: (1) *Literature.* (*a*) Books for teacher; for pupil. (*b*) Magazines — References: *National Geographical Magazine* (Washington, D. C.); *Journal of School Geography* (New York); *Scottish Geographical* (Edinburgh); *Journal of Geography* (London). (*c*) Foreign newspapers and almanacs. (2) *Maps* — relief; chalk models; hachure; physical; contour; political; weather; crop bulletins, etc. (*a*) Use — adaptation of different kinds of maps to grades. (*b*) Making — sand and chalk modeling; mapping of topographical features in vicinity, in contour, etc.; mapping of political districts, blocks, etc.; construction and projection. References: Maps — physical wall maps; Kiepert's series; Habericht-Sydow series; Rand-McNally. Atlases — Andree; Stieler; Berghaus; McMillan; Longman's *New School Atlas.* Political maps — Johnson; Bacon; Rand-McNally. Relief maps — Howells. Contour — U. S. Topographical Sheets and U. S. Topographical Folios. (3) *Globes.* (4) Davis' models; models showing faults, monoclines, etc. (5) Collection of pictures; collection of stereopticon slides.

QUESTIONS: What geographic aspects should receive deepest consideration in a course of study? What aspect of human geography is of greatest importance? Can human geography be taught without natural geography? (Reference: Herbertson, *Man and His Work.*) What is the value of the study of physiography? What consideration should be given the study of landscape from its scenic appearance? At what age does a child appreciate the beauty of landscape? What is the influence of landscape on the æsthetic and moral nature of an individual? What part has landscape played in art? In literature? At what age is a student interested in the history of landscape? What is the difference between the artistic and intellectual appreciation of landscape? Can one obtain an artistic appreciation of landscape he has never seen?

REFERENCES: Shaler, *Interpretation of Nature,* and "The Landscape as a Means of Culture," *Atlantic Monthly,* December, 1898; Geikie, *Scenery of Scotland;* Lubbock, *Scenery of Switzerland;* Hamerton, *Landscape.*

What is the value of a geographic laboratory in teaching? How should a laboratory be used in connection with field work? What part of geographic teaching should be done in the field? What kind of museum material is of greatest value in geographic study? How can the industries in one's environment be used as attractive geographic subject-matter? How can the study of geography be made to enter into the lives of the students? How can the student best enter into the social activities of the world?

EXPRESSION: What is the value of drawing, painting, writing, modeling, and making in the study of geography? In the teaching of the subject? What place should dramatic art occupy in geographic teaching?

CHICAGO.

(Studied as a type city.)

I. THE MAKING AND MEANING OF A CITY.

A. Location. Why?

B. Cause of growth: Relation to areas of production; to regions of consumption.

C. The city needs: food; houses; water supply; heat; light; means of transportation; sewerage; means of protection; government; education, etc.

D. Relation of Chicago to its local geography; to climate,

E. Agents which have contributed to the formation of the local geography of this region?

1. *Lake.*— Lake Michigan: (*a*) Use: commerce; water; fishing industry; sand industry. (*b*) The Chicago "lake flat": appearance; drainage; history. Study present action along the lakeshore in formation of beaches, bars, spits, cliffs. Reproduce similar forms in laboratory. (*c*) Harbors: Conditions for a good harbor. How maintain one? Necessity of lighthouses and life-saving stations. Location of great cities of the world which have good harbors.

REFERENCES: Salisbury and Alden, *Geography of Chicago and Its Environs;* Shaler, *Beaches and Tide Marshes* (A. B. Co.); Davis, *Physical Geography;* Tarr, *Physical Geography;* Russell, *Lakes of North America.*

2. *Rivers.*— The Chicago river, Calumet river, and Desplaines river. (*a*) How have these rivers contributed to the growth of Chicago? (*b*) Relation of the Chicago and Calumet rivers to the harbors. (*c*) Relation to the drainage of the city. (*d*) Nature of water parting between Chicago river basin and the Desplaines and the Calumet river basins; instability of water partings. (*e*) Source of water supply. (*f*) Physiographic action of a river. (Study ravines along north shore and stream action in laboratory.) Locate rivers of the world having notable cañons, large deltas, and flood plains.

REFERENCES: Geikie, *Earth Sculpture, Text-Book of Geology,* and *Physical Geography;* Tarr, *Physical Geography;* Russell, *Rivers of North America;* Scott, *Geology;* Roberts, *The Earth's History;* Mill, *Realm of Nature;* Shaler, *Aspect of the Earth;* Gilbert, *Henry Mountains,* U. S. Geological Survey.

3. *Glaciers.*—The contribution of glaciers to the local geography of Chicago. Excursions to Stony Island and Highwood. (*a*) Topography; nature of materials that compose the landscape; source of materials. (*b*) Extent of glaciation in North America; in Eurasia. (*c*) Location of existing glaciers in mountains and in polar regions. (*d*) Meteorological conditions favorable

to the formation of glaciers. (*e*) Movement and work of glaciers. (*f*) Proofs of different glacial epochs. (*g*) Was the North American continental glacier beneficial or detrimental to the areas affected? (*h*) What would have been the probable result, had the glacier reached the Gulf of Mexico? (*i*) What would be the probable condition here, had the glacier period never occurred?

REFERENCES: Salisbury, *Journal of Geology*, Vols. I and IV; Davis and Shaler, *Glaciers;* Davis, *Physical Geography;* Scott, *Introduction to Geology;* Chamberlin, *Terminal Moraine*, Third U. S. Geological Survey; Russell, *Glaciers of North America;* Geikie, *Earth Sculpture.*

QUESTIONS: In what grade would you introduce the study of glaciers, if you lived in a glaciated area? In a non-glaciated area. Why? What aspect of the subject would appeal to the different grades?

4. *Wind.*—What aspect of Chicago's local geography is due to wind? Excursion to Dune Park. (*a*) Appearance of dunes and associated swamps. Origin. Source of sand. Use of sand dunes. (*b*) Location of the dune areas of the world. Account for location. (*c*) Influence of wind on the water of the lake; in distribution of plants and animals; on sanitary condition of this city.

REFERENCES: United States weather maps; Davis, *Meteorology*, and *Physical Geography;* Terrell, *Popular Treatise on the Winds;* Waldo, *Elementary Meteorology;* Archibald, *The Story of the Atmosphere;* Gregory, *Elements of Physiography.*

QUESTIONS: In what grade should the study of the wind begin? What is the educational value of United States daily weather maps? What grades can profitably use the thermometer, barometer, and anemometer? How can the child's interest in kite-flying, balloons, and boat-sailing be utilized in teaching the subject of the winds?

II. NORTH AMERICA'S CONTRIBUTION TO CHICAGO.

Influence of the great central plain. If Rocky Mountains were located a thousand miles to the east, what would be the effect? Had the long slope of North America been interrupted by mountains in the region of the mouth of St. Lawrence, what would have been the effect upon Chicago?

NORTH AMERICA.

I. Consideration of North America as a great land mass in form, shape, size, drainage, and relation to the other continents of the globe.

1. *Climate.*—Prevailing winds. Movement of storms in the United States. Distribution of heat. Southern limit of the winter isotherm of 32°. Distribution of rainfall; snowfall. What would be the effect on the climate of North America if the eastern and western highlands had been reversed in position? What would be the effect on the climate of the plain if a high range of mountains crossed the northern country from east to west? What would be the effect upon this region if the Gulf of Mexico and the Caribbean Sea were land?

2. *Western highlands.*— Extent, altitude, appearance, and formation of Rocky Mountains, Sierra Madre mountains, Sierra Nevada mountains, Coast Range, Mexican Plateau, and Great Basin. Characteristics of river basin found in the western slope of the great highland mass, Colorado, Sacramento, San Joaquin, Columbia, Fraser, Yukon. What attractions for man does this western highland mass possess? What are the influences, both evil and good, of a desert or semi-desert region on the rest of the continent? For agricultural purposes, which is to be preferred, an irrigated region or a region of constant rainfall?

3. *Great central plain.*— Extent; elevation; winter and summer appearance; glaciated area; account for lakes; non-glaciated region. Characteristics of the river basins: Mississippi, Mackenzie, Hudson Bay system. Value of the great plain in the development of the continent. Would a different arrangement of lowlands and highlands improve the continent as a home for man?

4. *Eastern highlands.*— Extent, appearance, geologic formation of (*a*) Canadian highlands; (*b*) Appalachian system: New England mountains; Blue Ridge; Appalachian valley; Alleghany plateau; Piedmont. Account for the position of Delaware, Susquehanna, Potomac, New, and Tennessee rivers. What is the effect of the Piedmont region on the rivers which cross it? What is the value of the Appalachian highlands to the present inhabitants of the United States? In what way did the mountains aid the colonists? What influence did they exert on the Civil War? (*c*) Characteristics of St. Lawrence river basin.

5. *Coastal plain.*— Extent; appearance; formation; agricultural value. What influence did the coastal plain exert on early settlement? On the Civil War?

6. *Past geographies of North America.*— How are the past aspects of a continent obtained? What are the evidences that North America has had different coast lines? What are the evidences that the continent has passed through many changes of climate? What proofs are there that the topography has changed? Visit Field Columbian Museum. Study geologic exhibits.

MATERIALS which will be used in the development of the subject: relief, physical, contour, geologic maps of North America and United States; geological portfolios; United States weather maps; crop bulletins; photographs; projected pictures; charts; diagrams.

REFERENCES: Mill, *International Geography; Compendium of North America;* Reclus, *Earth and Its Inhabitants;* Shaler, *The United States of America;* Davis, *Physical Geography; National Geographic Monograph;* Willis, *The Northern Appalachians;* Hayes, *The Southern Appalachians;* Davis, *Physical Geography of Southern New England;* Russell, *Rivers of North America;* Russell, *Lakes of North America;* Russell, *Volcanoes of North America.*

In what grade should continental study be introduced? What kind of maps should be used at the beginning of geographic study? How can a map be used to perform its function as a symbol? Why do maps stand in the way of imaging the landscapes which they represent? What laboratory experiments would aid in imaging North America? What aspect of the country appeals most to younger pupils? When should the physical geography of the continent be taught?

EURASIA.

I. Why is Europe the center of interest of civilized people? Why is Asia of particular commercial and political interest at present? What regions are most attractive to the people of the Occident?

II. *Topography.*—(1) Size; compare with North America. (2) Location of mountains, plains, and plateaux. Compare the continental arrangement of plains, plateaux, and mountains with that of North America. Is the arrangement of mountains and plains most advantageous for man's occupation? Had the location of mountain ranges been similar to that of North America, would it have been better for civilization? Had the great plateau belt been in the northern part of the continent, and the plains in the southern part, would it have been better for human habitation?

III. *Drainage.*—Locate Arctic, Pacific, Atlantic, Indian, and inland systems. What effect have the drainage systems had upon the development of the continent? What river valleys of Eurasia have been "cradles" of early civilization? Why? Which are the most important rivers as highways at present? Which are most important to agricultural interests for irrigation? If the rivers of the Arctic system flowed south instead of north, would their value to man be increased or diminished? Why?

IV. *Prevailing winds.*—(1) Influence of westerlies. (2) Influence of monsoons. (3) Influence of trades.

REFERENCES: Mill, *International Geography;* Stanford, *Compendium of Asia,* and also *Compendium of Europe;* Mill, *Realm of Nature;* Reclus, *Earth and Its Inhabitants: Asia, Europe;* Sven Hedin, *Through Asia.*

CHINESE EMPIRE.

I. *Topography of eastern Asia.*—(1) Plateaux: Tibet, Pamir, Gobi. (2) Mountains: Himalaya, Kuenlun, Altyn, Tagh, Altai, Yablonoi, Khingan, Tsin-ling-Shan. (3) Plains of China: origin; use. (4) Rivers: Yang-tse-Kiang, Hoang-Ho, Si-Kiang, Tamir, Amur.

II. *Climate.*—(1) Winds; influence of high plateaux; deserts; typhoons. (2) Rain: Account for summer rains. Influence of fringing islands.

III. *Soil.*—(1) Loess region: extent; theories of origin; use; influence on Chinese civilization. (2) Red earth region: extent; account for productivity. (3) Alluvial plain: formation; agricultural uses.

IV. *Products.*—(1) Agricultural: national standing of farmers; government encouragement; manner of soil cultivation. (2) Minerals and metals:

extent of coal deposit, gold, silver, jade, copper, etc. (3) Manufactory: home manufactures; how carried on; introduction of factories.

V. *Cities.*— Peking, Cheefu, Shanghai, Hong Kong, Canton, Nanking, Hankow. Plan of building cities; pavement; domestic and religious architecture; means of procuring water, light, and heat; transportation facilities in north and south China.

VI. *Education.*— Describe a Chinese school. Describe examination in Peking or Canton. Influence of education on government.

VII. *Present political condition.*— Boxer movement an incident in the battle between Occident and Orient. International interest in political and commercial conditions in China.

History: Short story of China's past.

QUESTIONS: What constitutes China's greatness? What causes China's weakness? What can the Occident learn from the Orient? Should Russia control Manchuria? What justification is there for England's control of Kowloon, Hong Kong, Wei-hai-Wei? Germany's occupation of Kiao Chau? France's claim to Hainan? What was the influence of the Chinese-Japanese war? What do you predict for the future of China?

REFERENCES: Williams, *Middle Kingdom;* Huc, *Chinese Empire,* and *Travels in Tartary, Thibet, and China;* Mill, *International Geography;* Stanford, *Compendium of Asia,* Vol. I; Reclus, *Asia,* Vol. II; Holcombe, *The Real Chinaman;* Smith, *Village Life in China, Chinese Characteristics;* "Why the Chinese Dislike Foreigners," *Outlook,* Vol. LXVII (1901), pp. 216–21; "Remoter Sources of Troubles in China," *Outlook,* Vol. LXVI (1900), pp. 879–83; "Sources of Trouble in China," *Outlook,* Vol. LXVI (1900), pp. 1036–41; "Anti-Foreign Crusade in China," *Outlook,* Vol. LXVII (1901), pp. 113–18; E. Reclus, "Vivisection of China," *Atlantic,* Vol. LXXXII (1899), p. 329; Hart, "China Reconstruction," *Fortnightly,* Vol. LXXV, pp. 99–193; Bird Bishop, *Yangste Valley;* Yan Rhou Lee, *When I Was a Bov in China.*

INDIA.

I. *Influence* of India on present international problems.

II. *Conditions* which have contributed to the development of the Indian civilization.

III. *Location* in relation to other nations.

IV. *Size and shape.*

V. *Topography.*— Its influence upon climate, products, and people; peninsular region or Dekkan; Indo-Gangetic alluvial plain; Himalaya and Suliman mountains. (See physical map.) (1) Mountains: Influence of Himalaya mountains, Aravalla hills, Vindhya range, Satpura range, Western Ghats, Eastern Ghats. (2) Rivers: Location and value of Indus, Ganges, Brahmaputra, Narbada, Godavari, Kistna, Cauvery. Which rivers have sacred influence? Which have delta plains? Which have valleys corresponding in shape to those of "north shore"? Influence of Ganges delta plain on development of India. Commercial aspect of each of the above rivers. Use in irrigation.

VI. *Geology.*— Influence upon topography and products. Location and extent of alluvial, basaltic, and archæan formations. (See geology map.)

VII. *Rainfall and climate.*— Continental climate, December to May, during northeast monsoons. Effect of the Himalayas and Iran. (2) Oceanic climate, June to November, during southwest monsoons. Effect of Indian Ocean. (3) Account for cold weather, January and February; hot weather, March to May; rainy season, southwest monsoon, June to October; retreating southwest monsoon or so-called northeast monsoons period, November to December. (4) Effect of Himalayas, Western Ghats, and Arakan mountain ranges on rainfall. (5) Locate areas of constant rainfall; areas of constant drought; areas of uncertain rainfall. Locate regions most liable to famine and explain cause. (6) Irrigation. (*a*) Source of moisture: rain, rivers, underground reservoirs, lakes, and surface reservoirs. (*b*) Locate regions where rain is sufficient for crops; "black cotton soil" regions, which act as sponge in retention of moisture; regions where wells are employed, where surface reservoirs are used. (See geological map.) Why are tanks and lakes generally in the archæan? Wells in the alluvial tracts? Why neither is necessitated in the trap area.

VIII. *Crops.*—(1) Food crops: wheat, rice, millet, barley, sugar, spices, etc. (2) Oil seeds: linseed, rape and mustard, castor, sesamum, ground nut, etc. (3) Fibers: cotton, jute, hemp, rhea, silk, wool, etc. (4) Dyeing and tanning materials: indigo, safflower, etc. (5) Drugs and narcotics: opium, tea, coffee, tobacco, cinchona, Indian hemp, vines and other sources of alcohol, etc. (6) Miscellaneous products: cutch, lac, wild silk worms, india rubber, palm sugar, cocoanut, musk, myrobalan, etc.

IX. *Forests.*—Why has India a comparatively small area of forests? Locate regions where deodar, sal, teak, sandal, caouchouc prevail. (See forest map, *Statistical Atlas of India*, 1895.)

X. *Animals, domestic and wild.*— Predominance of buffaloes and cattle in domestic use. Influence of religious beliefs in preserving wild animals.

XI. *Economic minerals.*— Locate regions which produce coal, iron, oil, and tin.

XII. *People.*— Race, appearance, dress. (1) Cities: Account for few large cities in India. Contrast urban population of India, 5 per cent., with the urban population of England, 53 per cent.; meaning of each. (2) Languages: Account for the existence of eighty languages in India. Where are the Dravidian languages principally found? The Aryan languages? (3) Religions: Hinduism, Buddhism, Janism, Sikhism, Mohammedanism, Animism, Christianity. (See map of prevailing religions, *Statistical Atlas of India*, 1895.) Effect of religions on industries, society, architecture, and art.

XIII. *Political divisions.*— Bengal, Rajputana, Northwest Provinces, Panjab, Sind, Bombay Presidency, Madras, Haidrabad, Mysore, Tranvancore and Cochin, Kashmir, Assam, Burma, Nikobar, Lakadiv, and Maldiv islands. (1) Relation of native state to British government. (2) Government of British India. (3) Non-British states in India. Locate Portuguese India, French possessions, Nipal and Bhutan. Why not under British rule?

XIV. *History.*— Brief history of India. Compare with the history of China. Influence of religion on the lack of historic interest of the Aryan Indians. Has British rule been beneficial or detrimental to India? Why? What is your solution of the famine trouble?

EXPRESSION: Model and draw, in color, relief map of India in dry and wet seasons. Draw a typical Asiatic Indian.

MATERIALS: The subject will be illustrated by photographs, stereopticon views, products of India, manufactured and natural, books and work of Indian school children.

REFERENCES: *Statistical Atlas of India*, 1895; Mill, *International Geography;* Stanford, *Compendium of Asia*, Vol. II; Reclus, *Earth and Its Inhabitants*, Vol. III; Hunter, *The Indian Empire*, and *Brief History of Indian People;* Murray, *Hand-Book of India, Burma, and Ceylon;* Alfred Lyall, *The Rise and Expansion of the British Dominion in India;* Ferguson, *History of Indian and Eastern Architecture.*

The above outline is intended as an aid in the study of the subjects herein considered. Such part of it will be completed during the summer term as time permits.

MATHEMATICS.

GEORGE W. MYERS AND GERTRUDE VAN HOESEN.

THE TEACHING OF MATHEMATICS IN THE SECONDARY SCHOOL.

GEORGE W. MYERS.

IT is believed that a sound method of presenting mathematical truth will give due consideration to both theory and practice. Theory without practice is apt to be inert and inane, while practice without theory is dangerous, if not wasteful. Due regard will be paid to both these aspects of mathematical training, so far as time will admit, though special stress will rest upon "the doing" as a means to "the knowing." The construction and use of inexpensive apparatus for field work in connection with geometry, astronomy, and geography will be given some attention.